#10 Brief on appeal

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re application of	Steven M. Shepard		
Serial No.	09/623,071	Group Art Unit	: 2863
Filed	January 12, 2002	Examiner	Lau, Tung S.
For	DATA INTEGRATION AND REGISTRATION METHOD AND APPARATUS FOR NON-DESTRUCTIVE EVALUATION OF MATERIALS		

Attorney Docket No. : 64631-0031

Commissioner for Patents
Washington, D.C. 20231

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Date: 12/5/02 Joyce Krumpe

BRIEF ON APPEAL

Honorable Sir:

This Appeal is taken from the Examiner's Final Rejection dated July 9, 2002 (Paper No. 8) of Claims 1-28 in the above-identified application. The Notice of Appeal was timely filed on October 9, 2002. Submitted herewith are two additional copies of this Appeal Brief.

1. Status Of Claims

Claims 1-28 are pending in the application and are involved in this appeal. No claims have been allowed.

2. Status Of Amendments

No amendments have been filed subsequent to the final rejection.

3. Real party in interest

Thermal Wave Imaging, Inc. is the real party in interest of the present application. An assignment of all rights in the present application to Thermal Wave Imaging, Inc. was executed by the inventor and recorded by the U.S. Patent and Trademark Office at **Reel 011481, Frame 0617.**

4. Related appeals and interferences

There are no appeals or interferences related to the present application of which the Appellant is aware.

5. Summary Of The Invention

By way of background, various non-destructive methods exist for testing and evaluating subsurface defects in structures. (Page 1, lines 11-13) Some of these methods include changing the temperature of the sample and allowing the sample to return to equilibrium temperature. (Page 1, lines 14-16) Observing the heat flow in the sample with an infrared camera is then effectuated reveals the subsurface defects. (Page 1, lines 18-19).

However, with the above described method, the detected infrared image often bears little resemblance to the actual sample. (Page 1, lines 21-25). Moreover, the lens of the infrared camera often distorts the image, thereby further deviating the resemblance of the infrared image from the actual sample. (Page 1, lines 29-31). Therefore, it is difficult and time consuming to apply precise registration of the image on the sample. (Page 2, lines 3-5). Thus, the precise location of the subsurface defects is difficult to determine. (Page 2, lines 7-12)

An objective underlying the present invention is to provide a method and device for non-destructive testing that includes obtaining a defect image and a live image of the same sample and then superimposing one image on the other. (Page 5, lines 27-30). The user of the apparatus or method views the live image of the sample, rather than the sample itself, while transferring markings from the defect image to the sample. (Page 3, lines 3-5). Moreover, because both the defect image and the live image are distorted by the infrared camera lens and therefore have a one-to-one correspondence, the distorted image is used as the frame of reference for locating subsurface defects and marking the sample. (Page 3, lines 5-7). As a result of the above described method and apparatus, the marks in the defect image are transferred precisely from the defect image onto the sample and the need to map the distorted image to the sample in a separate step is eliminated. (Page 3, lines 8-10) In view of the foregoing, the advantages of the present invention will be appreciated.

6. Issues

A. Are Claims 1-28 unpatentable under 35 U.S.C. §103(a) over Devitt et al. (U.S. Patent No. 5,703,362) in view of Walters et al. (U.S. Patent No. 5,300,746) and Del Grande et al. (U.S. Patent No. 5,444,241)?

7. Grouping Of Claims

Claims 1-28 stand or fall together.

8. Argument

A. Claims 1-28 Are Not Obvious Over Devitt in view of Walters and Del Grande.

Claims 1-6, 10-14 and 17-28 were rejected as unpatentable under 35 U.S.C. §103(a) over Devitt et al. (U.S. Patent No. 5,703,362) in view of Walters et al. (U.S. Patent No. 5,300,746) and Del Grande et al. (U.S. Patent No. 5,444,241).[1] For the reasons set forth below, Appellant submits that all Claims 1-28 are in a condition for allowance.

To establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in

[1] Remaining Claims 7, 8 and 9 and Claims 15 and 16 are rejected over the above combination and further in view of Takashashi et al. (US Pat. No. 5,748,496) and Bittner (US Patent 5,541,696) respectively. As Claims 7, 8, 9, 15 and 16 depend from the independent Claims, Appellant submits that these claims are not obvious over the cited references for the reasons set forth with respect to Claims 1-6, 10-14 and 17-28.

the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings.[2] Second, there must be a reasonable expectation of success.[3] Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations.[4] MPEP 2142;

The Examiner states that Devitt discloses a nondestructive measurement method for detecting defect infrared images and comparing its characteristic properties using a computer, processor etc. The Examiner states, however, that among other items, Devitt does not show superimposing images. To overcome this shortfall, the Examiner states that Col. 8-9, lines 62-6 of Walters "shows the usage of the superimpos[ing] images."

A reading of Col. 8-9 of Walters reveals no resemblance to any claimed portion in the present application whatsoever, especially superimposed images. Instead, Columns 8-9 are directed toward a cooking arrangement for a microwave oven. The cooking arrangement includes overlaying two metallic wire meshes and spacing them apart from each other with a non-metallic material. The arrangement is then placed with the food to be cooked. During cooking in the microwave oven, the arrangement of metal and non-metal redirects the microwave radiation in a configuration for advantageously heating the food being cooked.

Appellant's claimed invention, as recited in independent Claims 1, 13, and 17, claims superimposing either a defect image or real time image over the other. Independent Claims 5 and 21 similarly recite superimposing the defect image over the real time image. The defect image shows defects in an observed structure. Due to distortion by characteristics inherent in obtaining the defect image, the defect image is overlaid with a real time image of the object. This allows the defects to be more easily mapped from the defect image to the real time image. As a result, one can then better determine the location of the defects with respect to the object being analyzed.

The only conceivable reason that Appellant can surmise for the Examiner's citation of Walters is the language "one laid directly over the other" recited in Column 8, line 66 of Walters. It is surmised that the Examiner mistakenly infers that this language has some bearing on superimposing images. However, the language in Walters is referring to

[2] In re Linter, 458 F.2d 1013, 173 USPQ 560 (CCPA 1972)
[3] In re Royka, 490 F.2d 981, 180 USPQ 580 (CCPA 1974)
[4] In re Mills, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990)

positioning two physical structures next to each other. These two structures are wire meshes. The purpose of positioning these meshes together is to redirect microwave radiation during cooking. This reference, however, has nothing to do with superimposing images. In fact, Walters as a whole has nothing whatsoever to do with imaging or non-destructive testing of any kind. Outside of inconsequential reference to the figures of the application, the term "image" or anything like it is not even mentioned. Walters, instead, relates to a microwave oven cooking aid and not to superimposed images. Therefore, the combination of references cited by the Examiner does not teach or suggest every limitation of the claimed invention. Even if such limitations were taught, there is no suggestion or motivation in any of the cited references (or anywhere else) to combine a microwave cooking tool to arrive at a non-destructive testing device and method that overlays images to enhance defect location.

Even assuming *arguendo* that Walters somehow established a prima facie case of obviousness, it is clearly non analogous art. "In order to rely on a reference as a basis for rejection of an applicant's invention, the reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the inventor was concerned." In re Oetiker, 977 F.2d 1443, 1446, 24 USPQ2d 1443, 1445 (Fed. Cir. 1992); see also MPEP 2141.01(a). Needless to say, the microwave cooking tool of Walters is not in the field of endeavor of non-destructive testing and evaluation of materials. One would not look to cooking appliances such as in Walters to find a solution to the problem of defect image identification. Accordingly, for at least these reasons, Claims 1-28 are allowable over the applied art. Thus, the Examiner's rejection of Claims 1-28 under 35 U.S.C. §103(a) over the applied art should be reversed.

9. Conclusion

For the above reasons, Appellant respectfully submits that Claims 1-28 are patentable over the applied art, taken singly or in combination. Therefore, the Board is respectfully requested to reverse the Examiner's decision.

Respectfully submitted,

Dated: Dec 5, 2002

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Appendix Of Claims On Appeal – Claims

1. A method for non-destructive evaluation of a sample, comprising the steps of:

obtaining a defect image of said sample,

displaying real time image of said sample on a display device, wherein the defect image and the real time image of said sample have a one-to-one correspondence with each other; and

superimposing one of the defect image and the real time displayed image on the other of the defect image and the real time displayed image.

2. The method of claim 1, further comprising the steps of:

locating a defect in the sample by way of the defect image;

referencing the sample while viewing said superimposed real time image and the referenced defect image on said display device.

3. The method of claim 2, wherein the step of referencing the sample includes the step of marking the sample according to the referenced defect image.

4. The method of claim 2, wherein the step of referencing the sample includes the step of measuring a characteristic of the sample at a selected location.

5. A method for non-destructive evaluation of a sample, comprising the steps of:

obtaining a defect image of said sample,

displaying a real time image of said sample on display device, wherein the defect image and the real time image have a one-to-one correspondence with each other;

displaying the defect image on a digital display device;

superimposing the defect image onto the display of the real time image; and

referencing the sample while viewing, on the display device, the superimposed real time and defect images.

6. The method of claim 5, wherein the defect image is an infrared image, and wherein the defect image and the live image are obtained from an infrared camera.

7. The method of claim 6, further comprising the steps of:

changing the temperature of the sample; and

obtaining at least one defect image over a time period of temperature change of said sample.

8. The method of claim 7, wherein the changing step includes directing a heating pulse onto the sample such that the heat is distributed generally evenly over the sample.

9. The method of claim 7, wherein the changing step includes directing continuous heat onto the sample such that the heat is distributed generally evenly over the sample.

10. The method of claim 5, wherein the reference step includes the steps of:

measuring a characteristic of the sample at a selected location; and

annotating the defect image with data obtained from the measuring step.

11. The method of claim 6, wherein the referencing step includes the steps of:

measuring a characteristic of the sample at a selected location; and

annotating the defect image with data obtained from the measuring step.

12. The method of claim 5, wherein the obtaining, displaying, superimposing and referencing steps are automated and conducted in a computer.

13. An apparatus for non-destructive testing/evaluation of a sample, comprising:

a camera that captures a defect image and generates a real time image of the sample;

a processor coupled with the camera to digitize the defect image and the real time image;

a display for displaying the digitized defect image and the real time image, wherein the processor and the display include means for referencing the defect image and superimposing one of the defect image and the real time image onto the other of the defect image and the real time image.

14. The apparatus of claim 13, wherein the processor and the display are constructed as part of the camera.

15. The apparatus of claim 13, wherein the camera is an infrared camera, and wherein the apparatus further comprises:

a hood having a reflective interior and an opening for the camera at a back portion and an open end at the front portion, wherein the sample is disposed in the front portion of the hood; and

at least one heating lamp disposed inside the hood to heat the sample.

16. The apparatus of claim 15, wherein the hood has a door to allow physical access to the sample by the user.

17. A computer readable storage device containing program steps used to direct the operation of a digital computer used for non-destructive testing and evaluation of materials, comprising the steps of:

obtaining a defect image and a real time image of the sample, the defect image and the real time image having a one-to-one correspondence with each other; and

superimposing one of the defect image and the real time image on the other of the defect image and the real time image.

18. The computer readable storage device of claim 17, further comprising the steps of:

locating a defect in the sample via the defect image;

referencing the defect image according to the located defects; and

referencing the sample after the superimposing step while viewing the real time image and the referenced defect image on a display.

19. The computer readable storage device of claim 18, wherein the step of referencing the defect image includes the step of marking the sample according to the referenced defect image.

20. The computer readable storage device of claim 18, wherein the step of referencing the defect image includes the step of measuring a characteristic of the sample at a selected location.

21. A computer readable storage device for non-destructive evaluation of a sample, comprising the steps of:

obtaining a defect image and a real time image of the sample, the defect image and the real time image having a one-to-one correspondence with each other;

displaying the defect image on a digital display;

superimposing the defect image onto the real time image on the display; and

referencing the sample while viewing the real time image and the defect image on the display.

22. The computer readable storage device of claim 21, wherein the defect image is an infrared image, and wherein the defect image and the real time image are obtained from an infrared camera.

23. The computer readable storage device of claim 22, further comprising the steps of:

changing the temperature of the sample; and

obtaining at least one defect image over a period of time where the sample temperature is changing.

24. The computer readable storage device of claim 23, wherein the changing step includes directing a heating pulse onto the sample such that the heat is distributed evenly over the sample.

25. The computer readable storage device of claim 23, wherein the changing step includes directing continuous heat onto the sample such that the heat is distributed evenly over the sample.

26. The computer readable storage device of claim 21, wherein the referencing step includes the step of:

measuring a characteristic of the sample at a selected location; and

annotating the defect image with data obtained from the measuring step.

27. The computer readable storage device of claim 22, wherein the referencing step includes the steps of :

measuring a characteristic of the sample at a selected location; and

annotating the defect image with data obtained from the measuring step.

28. The computer readable storage device of claim 21, wherein the obtaining, displaying, superimposing and referencing steps are automated and conducted in a computer.

AF/2863

TRANSMITTAL OF APPEAL BRIEF

Docket No. 64631-0031

In re Application of: Steven M. Shepard

Application No.	Filing Date	Examiner	Group Art Unit
09/623,071	1/12/02	Lau, Tung	2863

Invention: Data Integration and Registration Method and Apparatus for Non-Destructive Evaluation of Materials

TO THE COMMISSIONER OF PATENTS:

Transmitted herewith in triplicate is the Appeal Brief in this application, with respect to the Notice of Appeal filed: 10/09/02 .

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Dated: Dec 5, 2002

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